Answer on question #68946, Physics

Question The density of DNA is 1.1 gram per ml and molecular weight 6000 gram per mole. What is the value of average volume which is covered by its single molecule?

Solution Given those number we can find how many molecules are in 1.1 grams:

$$N = \nu \cdot N_a = \frac{m}{\mu} N_a = \frac{1.1}{6000} \cdot 6 \cdot 10^{23} = 1.1 \cdot 10^{20}$$

So, 1 ml has $1.1 \cdot 10^{20}$ molecules, hence 1 molecules in average takes volume of

$$V_m = \frac{1}{1.1 \cdot 10^{20}} \approx 0.9 \cdot 10^{-20}\, ml$$